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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/939,773 | 08/28/2001 | Koji Kikuchi | SON-2192 | 3157 |
| 23353 | 7590 | 04/29/2004 | EXAMINER | |
| RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036 | | | COLEMAN, WILLIAM D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2823 | |

DATE MAILED: 04/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 09/939,773 | Applicant(s) KIKUCHI, KOJI | |
| | Examiner W. David Coleman | Art Unit 2823 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) ____ is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed February 9, 2004 have been fully considered but they are not persuasive.
2. Applicant argues that Kung U.S. Patent 6,396,944 B1 herein known as Kung fails to teach the limitations of independent claims 1 and 6.
3. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., with minimal pattern transfer displacement) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).
4. Applicant contends that the obviousness-type double patenting rejection should be withdrawn because Ohnuma U.S. Patent 6,391,501 does not teach every limitation in the claims 1 and 6, namely Applicant contends that there is no disclosure or suggestion within the Ohuma reference "of finding optical conditions and mask structures which limit pattern displacement within a required range as recited in independent claims 1 and 6 of the present invention.
5. In response to Applicant's contention that Ohnuma fails to teach "of finding optical conditions and mask structures which limit pattern displacement within a required range, the Examiner discloses the equivalents of the claimed invention.
6. The term "of finding optical conditions and mask structures" is equivalent to determining the phases (i.e., which are optical conditions).

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7. The term “which limit pattern displacement within a required range” is equivalent to 180 degrees at the two sides of said fine patterns; extracting said plurality of fine patterns from already designed element shape patterns.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kung et al., U.S. Patent 6,396,944 B1.

Kung discloses a manufacturing method substantially as claimed.

10. Pertaining to claim 1, Kung teaches a manufacturing method of a phase-shift mask, comprising: seeking a relationship of optical conditions of an exposure optical system used for exposure and a mask structure with displacement of a pattern to be transferred by exposure; finding said optical conditions and said mask structure that limit displacement of said pattern within a required range, taking manufacturing errors of the mask into consideration; examining the optical conditions and the mask structure obtained to determine whether they ensure a required exposure tolerance and a required focal depth; and executing fabrication of such a mask to obtain said mask structure when the result of the examination is acceptable. However, the terms “seeking a relationship of optical conditions”, “examining the optical conditions” and “determine” are mental process steps. It would have been obvious to one of ordinary skill in the

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art that these mental process steps takes place in the Kung's semiconductor process in the fabrication of phase shift mask.

11. Pertaining to claim 2, Kung teaches the manufacturing method of a phase-shift mask according to claim 1 wherein said optical conditions include, at least, a numerical aperture [0015] and a partial coherence factor.

12. Pertaining to claim 3, Kung teaches the manufacturing method of a phase-shift mask according to claim 1 wherein said phase-shift mask is a Levenson phase-shift mask.

13. Pertaining to claim 4, Kung teaches the manufacturing method of a phase-shift mask according to claim 3 wherein said Levenson phase-shift mask is of a substrate-excavation-type, and said mask structure is regulated by the amount of excavation of a substrate.

14. Pertaining to claim 5, Kung teaches the manufacturing method of a phase-shift mask according to claim 1 wherein said Levenson phase-shift mask is of a phase-shifter-added-type, and said mask structure is regulated by the thickness of a phase shifter.

15. Pertaining to claim 6, Kung teaches a method of making a resist pattern

through exposure using a phase-shift mask, comprising:

seeking a relationship of optical conditions of an

exposure optical system used for exposure and a mask structure of

said phase-shift mask with displacement of a pattern to be

transferred by exposure;

finding said optical conditions and said mask structure

that limit displacement of said pattern within a required range,

taking manufacturing errors of the mask into consideration;

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examining the optical conditions and the mask structure obtained to determine whether they ensure a required exposure tolerance and a required focal depth; and when the result of the examination is acceptable, fixing said exposure optical system to the optical conditions selected, then actually manufacturing said phase-shift mask having the mask structure selected, and conducting exposure using said exposure optical system and said phase-shift mask. However, Kung fails to use the terms “finding”, and “examining”. It would have been obvious to one of ordinary skill in the art that these mental process steps takes place in the Kung's semiconductor process in the fabrication of phase shift mask.

16. Pertaining to claim 7, Kung teaches the method of making a resist pattern according to claim 6 wherein said optical conditions include, at least, a numerical aperture and a partial coherence factor.

17. Pertaining to claim 8, Kung teaches the method of making a resist pattern according to claim 6 wherein said phase-shift mask is a Levenson phase-shift mask.

18. Pertaining to claim 9, Kung teaches the method of making a resist pattern according to claim 8 wherein said Levenson phase-shift mask is of a substrate-excavation-type, and said mask structure is regulated by the amount of excavation of a substrate.

19. Pertaining to claim 10, Kung teaches the method of making a resist pattern according to claim 8 wherein said Levenson phase-shift mask is of a phase-shifter-added-type, and said mask structure is regulated by the thickness of a phase shifter.

Double Patenting

20. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

21. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

22. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

23. Claims 1-10 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 10 of U.S. Patent No. 6,391,501 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because seeking a relationship of optical conditions for exposure and a mask structure is merely nothing more than the equivalent of the step of determining and/or performing shapes of phase shift patterns as claimed in the patented invention.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

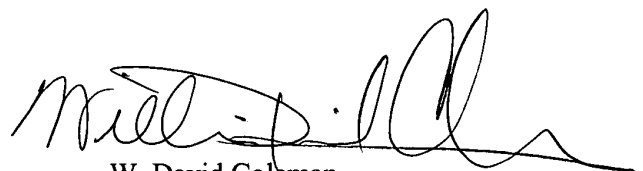
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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on 9:00 AM-5:00 PM.

25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'W. David Coleman', with a long horizontal flourish extending to the right.

W. David Coleman
Primary Examiner
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WDC